

Citation for published version:

Barnett, J, Begen, F, Howes, S, Regan, A, McConnon, A, Marcu, A, Rowntree, S & Verbeke, W 2016, 'Consumers' confidence, reflections and response strategies following the horsemeat incident', *Food Control*, vol. 59, pp. 721-730. <https://doi.org/10.1016/j.foodcont.2015.06.021>

DOI:

[10.1016/j.foodcont.2015.06.021](https://doi.org/10.1016/j.foodcont.2015.06.021)

Publication date:

2016

Document Version

Peer reviewed version

[Link to publication](#)

Publisher Rights

CC BY-NC-ND

The published version is available via: <http://dx.doi.org/10.1016/j.foodcont.2015.06.021>

University of Bath

Alternative formats

If you require this document in an alternative format, please contact:
openaccess@bath.ac.uk

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Consumers' confidence, reflections and response strategies following the horsemeat incident

Barnett, Julie¹, Begen, Fiona¹, Howes, Sophie ¹, Regan, Aine², McConnon, Aine², Marcu, Afrodita³, Rowntree, Susan⁴, and Verbeke, Wim ⁵

¹University of Bath, Claverton Down, Bath, BA27AY, United Kingdom

²School of Public Health, Physiotherapy & Population Science, University College Dublin, Ireland

³Food, Consumer Behaviour and Health Research Centre, School of Psychology, University of Surrey, Guildford, United Kingdom

⁴European Food Information Council, Tassel House, rue Paul-Emile Janson 6, B-1000 Brussels, Belgium

⁵Department of Agricultural Economics, Ghent University, Coupure links 653, B-9000 Gent, Belgium

Corresponding author Tel. +44 (0) 1225 38 3167 ¹ E-mail address: j.c.barnett@bath.ac.uk

Abstract

Following the discovery of horsemeat in beef products in Europe in 2013, restoring consumers' confidence in processed meat products as well as in all the agencies involved – producers, food safety authorities, retailers – soon became a key priority. However, the European public's confidence in processed meat products and their views about government and industry actions to manage fraudulent practices in the wake of this incident are poorly understood. The objective of this study was to identify the core issues affecting consumers' confidence in the food industry, particularly in the meat processing sector, and to explore the impact of the horsemeat incident on consumers' purchasing and eating behaviour. It involved the use of an online deliberation tool VIZZATA™ to collect detailed views of 61 consumers in the UK and the Republic of Ireland. Many participants reported buying fewer products containing processed meat as a result of the horsemeat incident. These respondents also claimed that their confidence in processed foods containing meat was lower than before the incident. Participants suggested restoring consumer confidence through improved traceability, sourcing local ingredients, providing clearer and correct labelling and stating the origin of meat on pack. Overall, findings indicate that rebuilding consumer confidence in processed meat products following a food adulteration episode is a multifaceted and difficult process. Food authorities and the food industry can benefit from the insights provided by this study to address issues affecting consumer confidence and to improve their communication strategies during future food adulteration incidents.

Keywords: Adulteration, Confidence, Consumer, Horsemeat, Integrity, Processed.

1. Introduction

In January 2013, routine testing of products sold by major retail companies in the United Kingdom (UK) and the Republic of Ireland (ROI) revealed that certain processed food products labelled as beef were supplemented or fully substituted with horsemeat (Food Safety Authority of Ireland (FSAI), 2013). This transpired to be a pan-European problem of meat adulteration often referred to by the media as “the Horsemeat Scandal”.

Months after the initial news story broke, the horsemeat incident continued to dominate the media headlines in the UK and Ireland. Reporting on the issue was stimulated by the publication of the results of the European Union (EU)-wide testing of beef products on 16th April which revealed that less than 5% of the tested products contained horse DNA (European Commission, 2013). The horsemeat adulteration of beef products not only had a direct impact on the European meat industry, but also indirectly insofar as consumer confidence in processed food sold by companies was affected. An inquiry into the integrity of the UK food network, which was commissioned by the UK government in the wake of the horsemeat incident, called for a national food crime unit to be set up, to protect consumers from food fraud incidents in the future (Elliott Review, July 2014).

The current study assessed the impact that the horsemeat incident had on consumers' confidence in the meat industry, their attitudes towards processed products containing meat, and the impact on their meat purchasing behaviour. It also follows up on a previous study, carried out just four days after the initial announcement by the FSAI, which examined consumers' immediate reactions to the findings, which we report elsewhere (Regan et al., 2015). We first consider two aspects of consumer confidence: in the food supply chain and around food safety incidents.

1.1. *Consumer confidence in the food supply chain*

On the whole, consumer confidence in the integrity and safety of the food supply chain is relatively high (de Jonge et al., 2004). For example, in the absence of a meat safety issue, less than 10% of consumers indicated they were ‘not confident’ about purchased beef and beef products, while the rest felt ‘confident’ that the consumption of beef and beef products would not result in adverse health effects (Van Wezemael et al., 2011). Trust in the food supply chain is also high in the absence of a food risk (Taylor et al., 2012). There is lack of agreement among researchers, however, on how to define trust, as the terms ‘confidence’ and ‘trust’ are sometimes used interchangeably. Siegrist (2010) described the importance, as well as the difficulty, of distinguishing between these two concepts noting that trust is based on value similarity, while confidence is based on performance (Siegrist 2003). In an everyday context, confidence in food and considerations of risk are rarely visible; consumers' decision-making processes underlying their food purchases are usually based on subjective considerations of ‘quality’ and ‘choice’ (Green et al., 2003; Grunert, 2005), with the availability of a product in the marketplace being taken as an indication of its safety (Van Wezemael et al., 2010).

Consumers apply a number of search strategies to exert an element of control over the quality and safety of their purchases using intrinsic and extrinsic cues (Green et al., 2003; van Rijswijk et al.,

2008). When purchasing fresh meat products which are largely unbranded, consumers draw upon their prior experience (Fischer & Frewer, 2009) and use sensory and aesthetic intrinsic cues to approximate 'quality' (Green et al., 2003). In the case of beef purchases, consumers assess quality based on appearance (e.g. colour, freshness, visible fat/marbling, cut of meat) (Grunert et al., 2004; Acebrón et al., 2000) and use extrinsic cues relating to confidence in local retailers, labelling, and country/region of origin (McCarthy et al., 2005; Van Wezemael et al., 2010). Alongside inferred credence characteristics linked to health and nutritional values (Krystallis et al., 2006; Grunert et al., 1997), there is an expectation that the use of these cues is associated with positive outcomes for diet quality. Quality is not the only criterion by which consumers select their food purchases. Alongside a general preference for less processing of foods (Verbeke et al., 2010), there is a conflicting desire for convenience and 'value-for-money' in everyday life. Because consumers use these cues routinely and perceive themselves to have 'information sufficiency' (Fischer & Frewer, 2009), they are unlikely to question the characteristics by which they select products. Only when the product is unfamiliar or in circumstances of questionable food safety, will consumers seek a broader range of extrinsic cues (e.g. hygienic conditions at the place of purchase, brand, or country of origin) upon which to base their decisions (Fischer & Frewer, 2009).

Overall, consumers select their purchases based on heuristics framed in terms of benefit rather than risk (Fischer & Frewer, 2009). Implicit within these decisions, however, is the trust and confidence in the social systems which ensure the safe production, management and delivery of food products. Consumers trust that actors within food risk management are pro-active in their maintenance of public protection (Van Kleef et al., 2007; Yeung et al., 2010), and that mechanisms are embedded at every level of the system in order to respond promptly to control any potential food risk (Houghton et al., 2006).

1.2 Consumer confidence following a food risk incident

Consumers' attitudes to risk and confidence in food safety and the impact of these factors on personal consumption practices have been highlighted in previous work (Lobb, 2005). Food fraud, including the subcategory of economically motivated adulteration, is a food risk that is gaining recognition and concern (Spink & Moyer, 2011). Food fraud is an intentional act for economic gain, whereas a food safety incident is an unintentional act with unintentional harm. Both food safety and food fraud incidents can create adulteration of food with public health threats. In the absence of concrete information and fuelled by media coverage, consumer perceptions of risk can be intensified, which in turn may lead to a lowered demand for the suspect foodstuff (Burton & Young, 1996; Lobb, 2005; Verbeke, 2005). In these circumstances, the majority of consumers wish to be notified of uncertainty and recognise its inevitability but are less tolerant of perceived governmental inaction in ensuring adequate information provision or in managing the situation (Frewer et al., 2002).

Although each food risk incident is unique, consumers use a variety of strategies in order to mitigate ambiguities in information provision and resultant risk perceptions. Responses may include wider information seeking (e.g. Kuttischreuter et al., 2014) and attempts to exercise an element of control by maximising use of prior experience and routine intrinsic/extrinsic cues, which act as 'risk

relievers' (McCarthy & Henson, 2005). Alternatively, consumers may simply change to different products or brands (Verbeke, 2005), or employ an 'optimistic bias' strategy in which the risk is not perceived to be meaningful to the individual themselves (Miles & Frewer, 2003; Zingg et al., 2013). Given that such a wide range of consumer responses are observed, food risks pose a relatively intangible challenge for individual consumers and actors within the food-chain alike. Whilst attempts have been made to categorise consumer responses in the context of a range of potential food safety issues (for example, Christoph et al., 2008; Verbeke et al., 2007), the complexity of interactions between individual, interpersonal, societal, and cultural responses make such a categorisation problematic. This in turn presents a particular challenge for risk communicators. Consumers' informational needs are often contradictory and no generalised response is possible (Verbeke et al., 2007). For example, whilst some consumers express a desire for information on uncertainty and traceability, and request more extensive labelling, others prefer that such information is limited, simple and more transparent, or do not attend to the information presented (Arens et al., 2011; Verbeke et al., 2006). Therefore, in order to attend to the broadest range of consumer preferences there is a need for targeted and appropriate information which is tailored specifically to each food risk incident. Although efforts have been made to achieve these aims, each new incident that arises in the food chain that has the potential to be a public health threat, is likely to compound consumer concerns, consolidating more general anxieties around food safety as a whole.

The horsemeat incident was a clear case of an acute crisis where instrumental change resulted in the deliberate introduction of a hazard into the human food chain (Frewer et al., 2015). A multitude of practical, ethical, religious, safety and health considerations form the backdrop against which the horsemeat incident is situated. From the consumer perspective the incident had unique attributes by raising doubts about meat authenticity and integrity (O'Mahony, 2013; Premanandh, 2013) and the reliability of the food labelling system, thereby undermining confidence in both the intrinsic and extrinsic cues which many consumers rely upon on a day-to-day basis. Against this background, the current study aimed to explore the impact of the horsemeat incident on consumers' confidence in the food supply chain and response strategies in terms of expectations of the conduct of others and personal food consumption practices.

2. Methods

2.1 Design

An online deliberation tool (VIZZATA™), which had been specifically designed to explore citizen engagement and deliberation in the form of an asynchronous dialogue between participants and the research team, was employed (Barnett et al., 2008). Participants can use the tool to leave questions and comments in relation to the study material and in turn, they receive individual responses from the research team. The tool has been previously used to explore consumer deliberation around red meat risks and benefits (Rutsaert et al., 2015), consumer reactions to the novel concept of synthetic meat (Marcu et al., 2015) as well as the early stages of the horsemeat incident (Regan et al., 2015).

2.2. Participants

Eighty-seven meat consumers from the United Kingdom (UK) and the Republic of Ireland (ROI) were recruited via a market research agency and invited into the study via email. Of these, a total of 61 participants (29 from UK and 32 from ROI) completed the study. All of the participants ate red meat at least once a week, had bought processed meat products within the last 12 months, and were aware of the horsemeat incident. Profiles of the participants are provided in Table 1.

Table 1.

Profiles of participants per country (frequency)

Participants' profiles	Ireland (<i>n</i> = 32)	UK (<i>n</i> = 29)
Females	24	18
Males	8	11
Age range		
18-30	5	3
31-35	7	5
36-40	2	3
41-50	9	7
51+	9	11

2.3 Procedure

The study went live on the 10th May 2013, four months after the original FSAI press release and during a period of continued press coverage about the horsemeat incident. The first phase of the study was completed on the 13th May 2013 and over the period 13th - 16th May, the researchers worked on grouping the questions and comments and preparing responses to them, using official resources and media reports which cited official sources. The responses were sent to the participants on the 17th May.

In a second phase, participants were provided with text comprising of a brief round-up of the views that came back from all of the participants from the first phase of the study. Participants were asked to supply some final questions and comments in reply to this information. It was explained that feedback would not be provided to these questions and comments. This second phase of the study was closed on the 21st May.

For their participation, the Irish respondents were remunerated with €25 One4all vouchers while the UK respondents received £25 Amazon e-vouchers.

2.4 Online deliberation

The online tool VIZZATA™ has been designed to present short sections of information to participants (e.g. text, images, audio, or video), known as ‘content testers’ (CTs) and elicit participants’ questions and comments in relation to these.

After an introductory page explaining the nature and purpose of the study, the participants were presented with six questions about their practices and attitudes relating to processed meat. Closed questions were used to gather information on frequency of purchase and confidence in the safety and quality of processed meat products. The open questions were used to collect information on the benefits, quality indicators, drawbacks and strategies which consumers consider when buying these products.

Next participants considered four CTs. CT1 provided textual information on the measures proposed by the European Commission to strengthen controls in the food supply chain. CT2 gave some examples of the consequences of the horsemeat incident on the meat processing industry (e.g. product recall, suspended contracts, arrests and prosecutions). CT3 focused on actions that supermarket chains had taken following the incident (e.g. changes to meat sourcing, DNA testing). CT4 provided information on issues with the supply chain and traceability of food and showed an image from the BBC website, mapping the meat route and order process of beef products adulterated with horsemeat in Europe. Each CT had up to six highlighted glossary terms, which participants could click on to reveal additional information. Participants had the opportunity to ask questions and make comments on each CT, by clicking the ‘Ask a question’ or ‘Make a comment’ buttons at the bottom of each content tester page. Participants could click back to view previous CTs at any time. After viewing and responding to the CTs, participants were asked some final questions regarding changes to their shopping habits since the incident, actions that could be taken by the food industry to restore consumer confidence, and perceptions of how the issue had been handled by the authorities. Annex 1 provides a detailed outline of the questions and content testers used in the study. The full text of the content testers can be obtained from the authors.

The VIZZATA™ software recorded the time participants spent in each CT pane, viewing glossary terms and leaving questions and comments, how many glossary terms they clicked upon, and how many questions and comments they left on each page. The questions and comments made in response to the CTs and open ended questions were downloaded in a Microsoft Excel-compatible CSV file for qualitative analysis.

2.5 Framework and Analysis

To answer the research question and to explore the impact of the horsemeat incident on consumer confidence in the food supply chain and upon personal food consumption practices the focus was on the qualitative data generated through Vizzata™. An inductive thematic analysis was conducted on the participants’ comments and questions and their responses to the open questions. We sought to identify themes that represented recurring patterns in the data (Joffe & Yardley, 2004; Braun & Clarke, 2006), based on which the analytical framework presented in Figure 1 was developed. The basic premise of the study is that consumers’ confidence in the food chain has been challenged by the occurrence of the horsemeat incident. Such challenge is expected to trigger response

strategies aiming at restoring confidence, which can be behavioural adaptations by consumers themselves (i.e. personal or internal response strategies), and/or expectations vis-à-vis third parties such as the food industry or authorities (i.e. expected external response strategies).

First the researchers (JB, SH and AMc) familiarised themselves with the data by reading and re-reading it. The material was then coded into categories that represented themes with a similar core meaning, although, within each theme we sought to incorporate as wide a range of perspectives as possible. The coding of the data was initially developed by JB and SH and then refined in discussions with AMc. Themes and theme descriptions were reviewed by all authors.

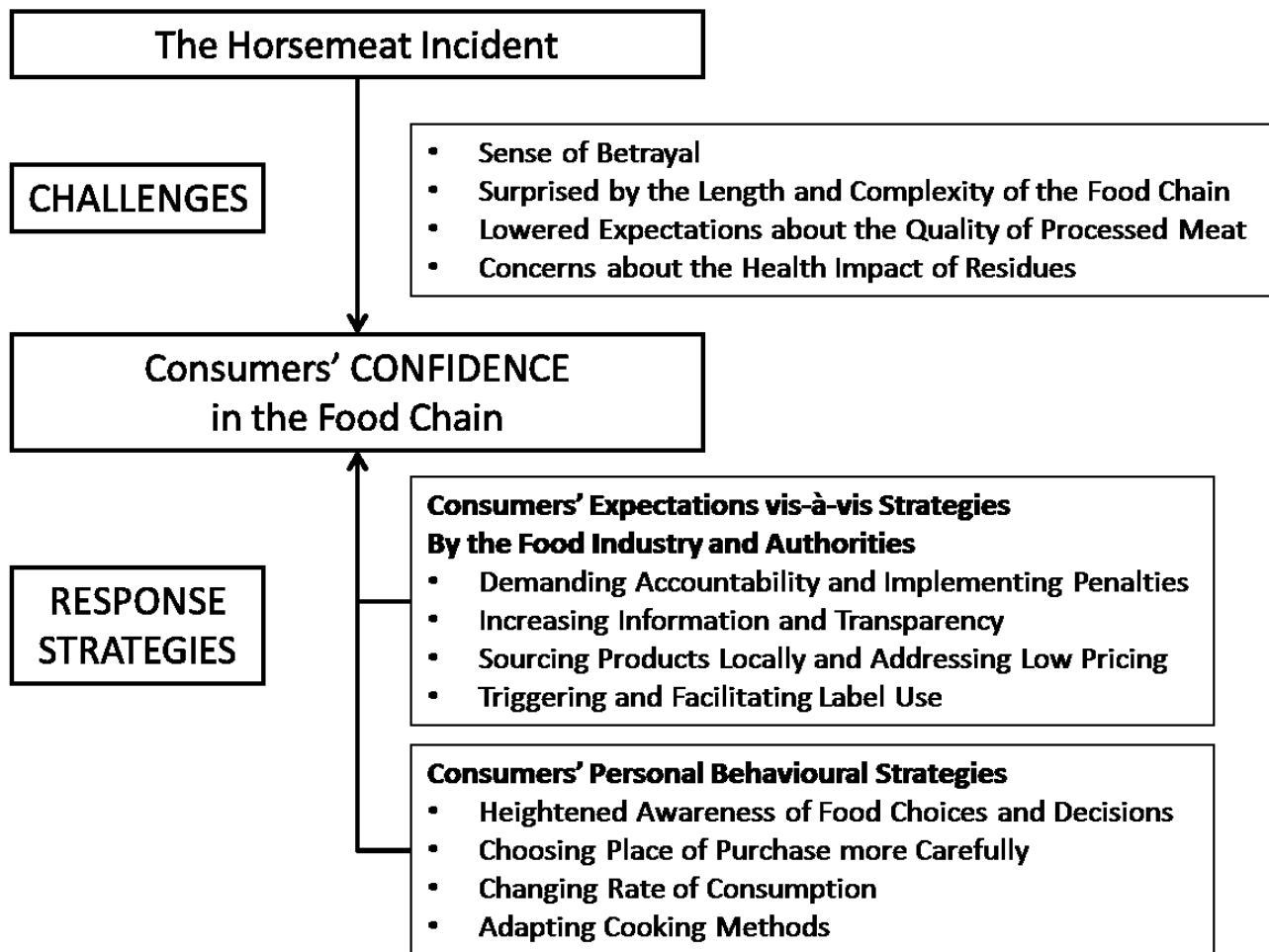


Figure 1.

Conceptual / analytical framework for the study on consumers' confidence in the food chain: Challenges imposed and response strategies induced by the horsemeat incident

3. Results and discussion

Three overarching themes were identified within the participants' questions and comments and through responses to the open ended questions: *Challenges to consumer confidence*; *Actions the food industry can take to restore confidence*; and *Strategies for increasing confidence*. Findings are

illustrated with quotes provided by the study participants. The code at the end of each quote provides details about the participant's gender, age, country of residence and unique participant number.

3.1 Theme 1: Challenges to consumer confidence

There were four aspects of the horsemeat incident that challenged consumer confidence in the food chain: a sense that they had been betrayed; the perceived complexity of the supply chain, low expectations of processed meat products and health concerns about residues.

3.1.1 Sense of betrayal

This subtheme expresses the deceit and fraud consumers associated with horsemeat adulteration. Many participants highlighted betrayal and lack of integrity as aspects of the incident which challenged their confidence. These factors sometimes overshadowed their opinions on the health concerns (see section 3.1.4):

'I don't think it's the issue that it isn't a risk to health. I think the issue is that people were misled, and sold horse as beef.' Fem. 32, UK (#2049)

The issue of eating the horsemeat itself was not expressed as the main problem. Indeed some stated that selling horsemeat, or beef that contained a little horsemeat, would be acceptable to them as long as the contents were stated accurately and honestly.

3.1.2 Perceived complexity of the supply chain

Participants generally expressed surprise at the length of the supply chain and reflected their lack of awareness of its complexity:

'Very scary that meat could come from so many countries and sources, and pass so many different hands before it ends up in a supermarket to be purchased. I never realised before the horsemeat issue that it was this complex!' Fem. 44, ROI (#2061)

Several participants questioned how this system was economically viable and whether quality and freshness were compromised by the extensive supply chain, which gave rise to additional doubts about the way food is preserved or handled to stay safe and fresh:

'If it takes so long why isn't our food 'off'?' Fem. 36, UK (#2028)

There were concerns that companies in the food supply chain may prioritise profit before acting in line with the values held by their customers. Previous research has shown that consumers may tolerate uncertainty and potential risk if honest and transparent information is provided. However,

where dishonesty or vested interests within the system are perceived to be putting consumers at risk, trust will be rapidly eroded (Frewer, 2004).

The complex supply chain also raised doubts about the safety of the food due to a low confidence in the safety standards of other countries in the supply chain. Some participants, particularly those from Ireland, explicitly expressed confidence and pride in their country's standards, and were of the belief that the standards in other countries did not match their own. This is in line with a study by Van Wezemael et al. (2010) which refers to the greater perceived safety of beef from one's own country or region over beef of foreign origin:

'I feel that standards in Ireland are well monitored but I am not so sure about other EU countries. It is difficult to work out where the products are from.' Fem. 44, ROI (#2033)

3.1.3 Low expectation of processed meat products

Participants expressed a general lack of confidence in processed meat products due to low expectations of the health and quality of products which are considered as heavily processed. Concerns referred to knowledge of potential unhealthy ingredients and long term health effects of eating these products too often:

'The whole 'processing' of the meat destroys any goodness contained and adds things to the meat that are really not very healthy. There have been links to cancer and processed foods. Also, the 'horsemeat' scare... you just don't know what you're eating! It's disgraceful! As if processed food wasn't bad enough already.' Fem. 46, UK (#2008)

Participants also talked about the role that consumer demand for quick and convenient food had in lowering the quality of meat products. Some blame was attached to the consumer for desiring cheap products, which gave the incentive to industry to produce low quality food. Some participants, particularly those that were primarily responsible for food provision for the family, noted increased awareness of implications of their own purchasing practices. For instance, one participant expressed concern about the impact that her food choices could have on her daughter's health:

'I have a 14 year old daughter and I have become more aware of what I am cooking for her and the potential future damage I am causing to her health.' Fem. 48, ROI (#2030)

For some, increased awareness of what processed meat might contain was in tension with the financial circumstances that meant this was the only viable choice of meat:

'You don't know what meat is in processed meat products. I assume it's the horrible leftovers from the animal, but in some cases there is not even high meat content (like in value range sausages). They're good in that they let families afford to eat meat every night, but the quality can be pretty dubious.' Fem. 23, ROI (#2043)

3.1.4 Health concerns about residues

Where health concerns were expressed these were focused on the possible presence of phenylbutazone (or 'bute') and the veterinary history and health status of the horses that were slaughtered. Phenylbutazone is an anti-inflammatory drug used as a painkiller in veterinary medicine, which is not authorised for use in food-producing animals in the EU. Some accepted that the dose at which it might be present was not harmful but considered its presence unacceptable and did not want to eat a product containing traces of phenylbutazone. The potential presence of the drug had considerable 'signal value' (Kasperson et al., 1988) as being indicative of slack processes and a lack of careful regulation. Concerns that the presence of this drug may have been higher, or more harmful, than expert assessments indicated were expressed:

'How does the Chief Medical Officer know that 'bute' in low amounts is NOT toxic? There are people who have certain medical conditions (or underlying medical conditions) who MAY be affected by 'low' amounts. What proof does he have to substantiate this claim?' Fem. 46, UK (#2008)

This concern about chemical contamination of food chimes with previous research. The presence of veterinary drug residues such as antibiotics is frequently stated as a top concern about meat safety by consumers (Verbeke et al., 2007). The comment below illustrates a common theme: both the concern over the presence of drug residues and the explicitly de-coupling of this from concern about eating horsemeat per se:

'I was not worried about the horsemeat DNA found in processed meat. The percentage of horsemeat in the product was not enough to concern me. However the thought of bute being present in my food worries me.' Fem. 44, ROI (#2033)

In line with low confidence in the authority's reassurance of phenylbutazone not being present in the meat or not being harmful to health even if present, consumers raised the spectre of other harmful or at least unknown ingredients or residues being present but undetected by the food safety authorities. This was situated in the context of more general concerns about organisational 'recreancy' around safety and hygiene standards in processes of production both in individual production sites and right across the food chain. The concept of 'recreancy' draws attention to "the failure of institutional actors to carry out their responsibilities with the degree of vigour necessary to merit the societal trust they enjoy" (Freudenburg, 1993).

'To be honest the horse scandal made me worry more about other issues, e.g. if these factories and processors are happy to sell us horsemeat for profit, how lax are their hygiene practices?' Fem. 32, UK (#2049)

It is important to note that a minority of participants explicitly expressed no concern after the horsemeat incident. This was described with relaxed attitudes towards health risks, an acceptance of modern day food processing or confidence in food authorities. There are a range of possible

explanations for taking these positions. Results and reporting of the EU-wide testing for horsemeat DNA and phenylbutazone published in April 2013 (European Commission, 2013) which confirmed that there was no food safety issue, may have influenced the reactions of consumers, e.g. by alleviating their concerns. Little concern may be expressed about issues that do not represent a concrete threat or make a difference to everyday life (Petts, 2001). Green, Draper and Dowler (2003) showed how food choices are made with recourse to everyday rules of thumb that distance discourses of risk and safety. In a more psychological explanation, consumers may show 'optimistic bias' such that the risk is not perceived to be meaningful to the individuals themselves (Miles & Frewer, 2003; Zingg et al., 2013):

'I am not adverse to eating horsemeat and seeing as there was no huge health risk as a result of the "contamination" it doesn't bother me. I also have faith in the authorities to respond and control the fraud.' Fem. 21, ROI (#2051)

3.2 Theme 2: What the food industry and authorities can do to restore confidence

3.2.1 Demanding accountability and implementing tougher penalties

A cautious attitude was expressed towards the measures being suggested by the food authorities to avoid a repeat of the horsemeat incident. These included tighter controls on horse passports; regular, unannounced inspections and testing; and tougher penalties for food fraudsters. Participants requested more clarity on how these measures would be implemented and enforced. There was doubt regarding their sufficiency and questions were raised about the priority of measures to monitor a vast food supply chain in the context of financial constraints.

'Measures would include performing regular and mandatory unannounced official controls. Who is going to provide the money and manpower for these extra tests? Which government would get the fine money?' Fem. 58, UK (#1998)

Participants asked when the suggested measures would be enacted and said that visible penalties for breaches would increase their confidence that such adulteration incidents would not happen again. Although there was a desire for clear lines of accountability there were also mixed views on whether primary responsibility for this lay with the government, food authorities or food companies. This echoes Van Wezemael et al.'s (2010) finding that consumers referred to many different parties that should be held accountable for guaranteeing the safety of beef and beef products, including farmers, inspectors, veterinarians, processors, scientists and independent control organisations.

3.2.2 Increase information and transparency

Concern was expressed, not only about whether previous measures were stringent enough but also whether information had been withheld from the public. Some participants spoke about the food companies and the authorities being the culprits while others mentioned that the media provided

limited and sometimes distorted information, which did not include full details about implementation. Regardless of the stakeholder mentioned, in general participants felt that more information was necessary:

'Increase transparency; let the public know what procedures they use to test, make the supply chain more visible (like with vegetables, when you know what farm they come from), label the ingredients with less jargon. I think supermarkets (and the Government) could indicate which brands were never caught up in it [the horsemeat incident], or deem certain brands safe, holding regular investigations.' Fem. 23, ROI (#2043).

Ensuring transparency can be difficult for risk communicators, as evident during the bovine spongiform encephalopathy (BSE) crisis in the UK, which exemplified the impact that a perceived lack of transparency can have on consumer trust and confidence (Van Kleef et al., 2007). Failure to immediately communicate to the public the scientific uncertainties relating to the risk presented by BSE contaminated beef led to a sharp decline in public trust (Miles & Frewer, 2003). As here, previous work has found that consumers wanted information about uncertainty around food problems as soon as it was identified. The source of the uncertainty is important for public acceptability - uncertainty due to mismanagement is much less acceptable than that where it is a function of scientific processes of risk assessment (Van Kleef et al., 2006).

3.2.3 Source products locally and address pricing of processed food

There were a number of 'why' questions referring to the length and complexity of the supply chain, and many participants wondered how this system could possibly be economically viable (see section 3.1.2). There was a desire for food processors and supermarkets to increase sourcing of local produce and to reduce the length of the supply chain:

'Why do food chains have to be so long and complicated? Would it not make more economic sense to keep the supply local especially with the rising cost of fuel etc.?' Fem. 58, UK (#1994)

In addition, there were questions around the price of products. Some participants suggested banning the 'economy' ranges to reduce the incentive for the use of lower quality ingredients. This echoes Van Wezemael et al.'s (2010) study which found that meat consumers considered a 'cheap price' on beef as a sign of lower trustworthiness in terms of safety:

'Perhaps drop the ultra-economy ranges altogether - they only encourage this sort of thing. When price is unfeasibly low, something's got to give. Quality is always the first thing to go.' Male, 61, UK (#1994)

Some suggested that consumers who buy low priced items were unrealistic to expect a wholesome product whilst others did not equate cheaper products with problems and were concerned that doing so would lead to unnecessary price rises:

'It's all going to put the price of meat up and if someone is determined to cheat the system they will. My view is that it is a bit of an overreaction.' Male, 64, UK (#2016)

3.2.4 Trigger and facilitate label use

The participants' perceived that confidence could be increased through a stronger focus on the labels of meat products, as a further index of traceability and country of origin. There were also instances of participants independently seeking information on the internet to increase their confidence in knowing what to buy. Several participants reported an increased use of labels in the light of the horsemeat incident, describing a more thorough assessment of a product before purchasing. Others expressed increased awareness of labels when buying a new product, only buying products that had been made in their home country, or maintaining the purchase of familiar products. One participant explained that her increase in label use had broadened her knowledge of the added ingredients in other non-meat processed products. She had used this knowledge to explain her concerns of health risks, increased allergies and food intolerances, in herself and in others:

'I always read food labels in detail now; it's truly shocking to see what is used in food processing as a whole, dairy products in cooked chicken, crisps, additives of all kinds. No wonder people including me are developing food intolerances.' Fem. 55, ROI (#2066)

Several commented that the horsemeat incident had no impact on their attention to labels, due to existing vigilance in this area or having previously decided not to consume processed meat thus indicating low confidence in processed meat products prior to the horsemeat incident:

'There has been no change. We are always careful to read the labels on processed food, we buy very little of it and tend to use the same manufacturers and retailers all the time.' Male, 74, UK (#1996)

Furthermore, other participants reported not spending more time attending to labels, either due to buying fresh rather than processed products, or to simply having confidence in the safety of products available at the point of sale. The latter idea has also been reported by Van Wezemael et al. (2010).

Lastly, some participants reported not using the labels anymore or not increasing their use of labels for a second reason, i.e. low confidence in the honesty and accuracy of labels. One participant stated that he read the labels *'to see how much rubbish is in what I am buying'*. This is an interesting statement as it seems to emphasise the expectation or acceptance of low quality. There were comments that labels were difficult to interpret and some participants described labels as 'jargon'. One participant expressed the view that few consumers would have an understanding of the items on the ingredients list:

'...most consumers would not be aware of the different names on the ingredient list, not knowing what they mean, scientific terms etc., so maybe there should be plainer wording for the ingredients label.' Fem. 25, ROI (#2046)

3.3 Theme 3: Strategies for increasing confidence

3.3.1 Heightened awareness of food choices and decisions

Perceived causes of low confidence after the horsemeat incident were predominantly aimed at societal level aspects, such as the belief that companies in the food chain place profit above care for consumers and their values and reduced trust in food safety authorities and the food supply chain; however, this section outlines how consumers also focused on the need for a change to their individual practices in order to combat this societal problem and increase their confidence when purchasing meat products. In a previous study, when consumers were asked explicitly about who should be responsible for beef safety, while they did not refer directly to 'consumers' as such, they nevertheless talked about their own responsibility for beef safety when discussing cooking methods and individual choices of beef cuts and products (Van Wezemael et al., 2010).

The participant quoted below clearly explains the source of his low confidence in societal aspects of food provision, and therefore justifies his reasons for carrying out more individual methods to 'protect' himself:

'Those supermarket chains and their suppliers have breached the trust we had in them prior to the scandal. Who can say they are still not perpetrating the evil but in a more "careful" manner so as not to get caught? Therefore, it's better for individuals to protect themselves by monitoring where and from whom they want to buy processed meats.' Male, 34, ROI (#2057)

This self-reliance does not come as a surprise, as research shows that even in the absence of a food scare, consumers apply a number of search strategies to exert an element of control over the quality of their purchases, for example in the case of beef purchases, consumers form expectations about quality at the point of purchase, based on their own experience and informational cues available in the shopping environment (Grunert et al., 2004; Acebrón & Dopico, 2000).

3.3.2 Choosing place of purchase carefully

Participants' heightened awareness was often channelled towards extrinsic cues (e.g. knowledge of the origin of the product and choosing a place of purchase where the item was traceable to the source). Consumers expressed that a practical step towards increasing confidence was to start or increase their purchase of meat products from their local butchers. The advantages this conveyed were that consumers could feel more confident about the source, could ask direct questions and obtain a kind of personal reassurance, and therefore felt 'safer'. This practise was also found during the bovine spongiform encephalopathy (BSE) crisis in the UK which had the potential to affect a variety of beef products and posed a proven human health risk. Some consumers reported

that they stopped or reduced their beef consumption for a time, or relied on trusted local butchers and the avoidance of processed products (Green et al., 2003). In a similar vein, Verbeke & Vackier (2004) reported that the consumer segment they identified as 'concerned meat consumers' indicated a significantly greater preference for purchasing from the traditional butcher over other retailers as a result of meat safety scares. Another frequently mentioned strategy among consumers in Belgium following the BSE crisis was more actively searching for information in order to find trustworthy outlets to buy 'good meat' (Verbeke et al., 2002).

The comment below indicates that being reassured of the source in person or actually being able to see or know the place where the meat has come from seems to be important in increasing confidence:

'I am still purchasing from the large chains of supermarkets, but I am buying more processed meat and sausages, burgers etc. from the local butcher, I trust him more and I can ask him more questions as to what goes into the meat.' Fem. 33, ROI (#2070)

As well as feeling more secure about the source of the product, another reason stated for choosing the local butchers as a place to purchase meat products was thus being able to ask questions about the contents of the product and the processing methods of the meat being sold, therefore being more assured about the contents. This idea of buying from the butcher was echoed by many participants and previous research by Verbeke & Vackier (2004) describes how consumers, especially those who had greatly reduced their meat consumption following a meat safety crisis, expressed a preference for butchers as suppliers of fresh meat because they can seek personal reassurance about product authenticity, quality or origin.

Places to purchase meat products were sometimes described negatively, in terms of places consumers would no longer frequent to purchase their products. Consumers reported avoiding supermarkets that were involved in the incident, supermarkets in general or fast food outlets. This was either due to a low confidence in the particular company's products, or as a matter of principle after the incident:

'I have lost confidence in the companies involved and would probably not buy any of their products again.' Fem. 41, UK (#1997)

3.3.3 Changing one's rate of consumption

Several participants commented about reducing or in some cases stopping their consumption of processed meat, refrigerated ready meals, and readymade frozen items. However, research indicates that consumers actually tend to underestimate the frequency of their convenience food purchases (Dunn et al., 2011), and there is an increasing trend towards consumption of convenience products (Grunert, 2006; Jabs & Devine, 2006). Prior research has shown that relatively regular users of processed foods report feelings of guilt and anxiety in consuming such products (Dunn et al., 2011; Olsen et al., 2009).

Some participants changed their purchasing behaviour around frozen ready meals, reflecting on why they bought them in the first place:

'I used to buy a lot of ready meals for the freezer. I work shift hours and found them convenient. Since the horse DNA scandal I have stopped buying this type of food.' Fem. 25, ROI (#2055)

Different qualities of meat were sought out compared to prior to the horsemeat incident. For example, participants reported buying more fresh cuts of meat or changing the type of meat they buy, e.g. more chicken and fish products. In addition, consumers reported purchasing more vegetables or vegetarian products instead of meat and processed meat. During food safety incidents, consumers have been known to change to different products or brands (Verbeke et al., 2007):

'I have altered my behaviour, have started trying to avoid any cheap quality processed meat in favour of things like burgers from the butchers or at least minimise the amount I'm eating, and go to brands that haven't been publicly caught up in the scandal when I do.' Fem. 23, ROI (#2043)

The above comment shows that consumers may have a range of strategies to deploy in order to increase their confidence in different situations and depending on the options available to them.

The cost of the item was also mentioned, with consumers sometimes opting for more expensive items in order to increase confidence in the quality of the product. This suggests lower confidence around more cheaply priced items:

'I still go for slightly more expensive products in the hope that they are better quality, although I realise there are no guarantees.' Fem. 52, UK (#2040)

Even though more confidence is generally accorded to more expensive products, for the participant quoted above, it is still necessary to 'hope' that they will be better in quality. High price is clearly not considered a guarantee of quality or of confidence. It is notable that here consumers have talked about stopping their purchase of cheap products themselves, regardless of whether they are stocked in supermarkets or not, indicating some personal responsibility to reduce perceived risk. However, in the debate of cost (section 3.2.3), there is a strong belief that supermarkets should not sell the cheapest products.

Interestingly, during past food safety incidents it was reported that certain consumers increased their intake of particular foods due to reduced cost. For example, during the BSE crisis certain consumers reported an increase in beef consumption, due to the relative reduction in the price of beef products (Green et al., 2003). Similarly, during the UK-based avian flu (H5N1) scare, some consumers lowered or stopped consumption of the specified items or wider poultry-based products, other consumers did not change their consumption behaviours during the scare or actively increased purchase due to price reductions, on the grounds that there was little safety risk and a perceived element of scaremongering (de Krom & Mol, 2010; Duffy et al., 2005).

3.3.4 Other mechanisms: Cooking methods

Further mechanisms the individuals used to enhance their confidence in the product included a change to their cooking methods. Participants reported making more of their food from scratch using fresh items they had purchased, for instance, buying minced meat from the butchers and making this into burgers by hand, or even mincing meat themselves and making their own products such as burgers and meatballs. Consumers reported buying fresh and then freezing their own products and regressing to more traditional ways of shopping and preparing food:

'It made me think about buying ready-made meals and convenience food. I have changed my shopping habits and am making a greater effort to cook simple fresh meals - more like what I had when growing up.' Fem. 65, ROI (#2062)

4. Conclusions

This study provides new data on the impact of the 'horsemeat incident' on consumer confidence in processed meat. It shows that diminished confidence resulting from the horsemeat incident was overwhelmingly of more concern than any potential safety issue. For many participants the problem was not with horsemeat per se but rather that the product labelling did not reflect the content and that fraudulent practices misled consumers. This breach in trust in the product, the producer and the legislator resulted in reduced purchase of processed meat. The results of this study provide an in depth look at factors affecting consumer confidence in light of the horsemeat incident and give insight into how food authorities, food companies and supermarkets could restore the confidence of consumers in the food industry. In order to achieve this, frequent suggestions included improving product traceability, sourcing of local ingredients, provision of clearer and correct labelling, paying more attention to personal communication and reassurance, and providing clear information about the origin of products. The study results also highlight new purchasing practices including what is bought and where it is bought from.

The findings reported in this paper are important for both government and the food industry when developing strategies to prevent and manage food fraud. The food industry needs to demonstrate consistent honesty and transparency to rebuild confidence in meat supply chains. However, simply making information available rather passively (e.g. through an information leaflet) proved insufficient to restore consumer confidence in beef following the BSE crisis (Verbeke, 2005), and the insights from this study suggest much the same. Consumers need to be more actively reassured that actors across the supply chain are operating in the consumers' interest, not their own financial interests. Governments, food authorities and food companies should provide greater clarity over who is responsible for regulation across the supply chain, particularly in the case of food fraud incidents which do not conform to existing protocols such as those of food safety.

The study showed that the horsemeat incident made consumers aware of certain previously unconsidered aspects of the supply chain, for example its complexity, length and scale and the inverse

relationship between the cost of finished products and the length of the supply chain. It was highlighted that ideally consumers would prefer a shorter supply chain and manufacturers and suppliers should consider if this is realistic for a modern and globalised food industry.

The findings of this study are also applicable to those involved in communication. Considering the wide spectrum of comments and questions consumers had regarding processed product ingredients, food labelling and supply chain traceability, there is a need for targeted and appropriate information, which is tailored specifically to each food-scare in order to satisfy the broadest range of consumer needs. Although efforts have been made to achieve these aims, each new crisis in the food chain is likely to compound consumers concerns; consolidating more general anxieties regarding food safety as a whole.

Acknowledgements

This research was conducted as part of the European FoodRisC project: Perceptions and communication of food risks/benefits across Europe: development of effective communication strategies, which was funded under the Seventh Framework Programme (CORDIS FP7) of the European Commission, grant agreement no. 245124. The authors acknowledge the work of Aoife De Brún, Christine Shan and Mary Friel in the data collection. The valuable comments of referees on a previous version of this manuscript are gratefully acknowledged.

References

- Acebrón, L., & Dopico, D. (2000). The importance of intrinsic and extrinsic cues to expected and experienced quality: an empirical application for beef. *Food Quality and Preference*, 11, 229-238. DOI:10.1016/S0950-3293(1099)00059-00052.
- Arens, L., Deimel, M., & Theuvsen, L. (2011). Transparency in Meat Production: Consumer Perceptions at the Point of Sale. *Journal of Agricultural Science and Technology*, 1, 1134-1145.
- Barnett, J., Fife-Schaw, C., Shepherd, R., Timotijevic, L., Fletcher, J. & Fletcher, D. (2008). Online Deliberative Engagement: A Pilot Study. A report for the Wellcome Trust. London: The Wellcome Trust.
- Burton, M., & Young, T. (1996). The impact of BSE on the demand for beef and other meats in Great Britain. *Applied Economics*, 28, 687-693. DOI:10.1080/000368496328434.
- Braun, V., & Clarke, V. (2006) Using thematic analysis in psychology. *Qualitative Research in Psychology* 3, 77–101. DOI:1191/1478088706qp063oa.
- Christoph, I., Bruhn, M., & Roosen, J. (2008). Knowledge, attitudes towards and acceptability of genetic modification in Germany. *Appetite*, 51, 58-68. DOI:10.1016/j.appet.2007.1012.1001.
- de Jonge, J., Frewer, L., van Trijp, H., Jan Renes, R., de Wit, W., & Timmers, J. (2004). Monitoring consumer confidence in food safety: an exploratory study. *British Food Journal*, 106(10/11), 837-849. DOI:10.1108/00070700410561423.

- de Krom, M., & Mol, A. (2010). Food risks and consumer trust. Avian influenza and the knowing and non-knowing on UK shopping floors. *Appetite*, 55, 671-678.
DOI:610.1016/j.appet.2010.1009.1022.
- Duffy, R., Fearne, A., & Healing, V. (2005). Reconnection in the UK food chain: Bridging the communication gap between food producers and consumers. *British Food Journal*, 107, 17-33. DOI:10.1108/00070700510573177.
- Dunn, K., Mohr, P., Wilson, C., & Wittert, G. (2011). Determinants of fast-food consumption. An application of the Theory of Planned Behaviour. *Appetite*, 57, 349-357.
DOI:310.1016/j.appet.2011.1006.1004.
- Elliott Review into the Integrity and Assurance of Food Supply Networks – Final Report. A National Food Crime Prevention Framework. July 2014.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/350726/elliott-review-final-report-july2014.pdf (19 September 2014, date last accessed).
- European Commission (2013). Commission publishes European test results on horse DNA and Phenylbutazone: no food safety issues but tougher penalties to apply in the future to fraudulent labelling. Press release (16th April 2013).
http://europa.eu/rapid/press-release_IP-13-331_en.htm (16 July 2014, date last accessed).
- Fischer, A., & Frewer, L. (2009). Consumer familiarity with foods and the perception of risks and benefits. *Food Quality and Preference*, 20, 576-585.
DOI:510.1016/j.foodqual.2009.1006.1008.
- Freudenburg, W. R. (1993). Risk and Recreancy - Weber, the Division-Of-Labor, and the Rationality of Risk Perceptions. *Social Forces*, 71(4), 909-932.
- Frewer, L., Miles, S., Brennan, M., Kuznesof, S., Ness, M., & Ritson, C. (2002). Public preferences for informed choice under conditions of risk uncertainty. *Public Understanding of Science* 11, 363-372. DOI:310.1088/0963-6625/1011/1084/1304.
- Frewer, L. (2004). The public and effective risk communication. *Toxicology Letters*, 149, 391-397.
DOI:310.1016/j.toxlet.2003.1012.1049.
- Frewer, L., Fischer A., Brennan M., Bánáti D., Lion R., Meertens R.M., Rowe G., Siegrist M., Verbeke W. & Vereijken C. M.J.L. (2015). Risk/Benefit Communication about Food – A Systematic Review of the Literature. *Critical Reviews in Food Science and Nutrition*.
DOI:10.1080/10408398.2013.801337
- Food Safety Authority of Ireland. FSAI Survey Finds Horse DNA in Some Beef Burger Products, 2013. <http://www.fsai.ie/details.aspx?id=11878> (16 July 2014, date last accessed).
- Green, J., Draper, A., & Dowler, E. (2003). Short cuts to safety: risk and 'rules of thumb' in accounts of food choice. *Health, Risk & Society*, 5, 33-52. DOI:10.1080/1369857031000065998.
- Grunert, K. (1997). What's in a steak? A cross-cultural study on the quality perception of beef. *Food Quality and Preference*, 8, 157-174. DOI:110.1016/S0950-3293(1096)00038-00039.
- Grunert, K., Bredahl, L., & Brunsø, K. (2004). Consumer perception of meat quality and implications for product development in the meat sector—a review. *Meat Science*, 66, 259-272.
DOI:210.1016/S0309-1740(1003)00130-X.

- Grunert, K. (2005). Food quality and safety: consumer perception and demand. *European Review of Agricultural Economics*, 32, 369-391. DOI:310.1093/eurrag/jbi1011.
- Grunert, K. (2006). Future trends and consumer lifestyles with regard to meat consumption. *Meat Science*, 74, 149-160. DOI:110.1016/j.meatsci.2006.1004.1016.
- Houghton, J., van Kleef, E., Rowe, G., & Frewer, L. (2006). Consumer perceptions of the effectiveness of food risk management practices: A cross-cultural study. *Health, Risk & Society*, 8, 165-183. DOI:110.1080/13698570600677373.
- Jabs, J., & Devine, C. (2006). Time scarcity and food choices: An overview. *Appetite*, 47, 196-204. doi:110.1016/j.appet.2006.1002.1014.
- Joffe, H., & Yardley, L. (2004). Content and thematic analysis. In D.F. Marks & L. Yardley (Eds.), *Research Methods for Clinical and Health Psychology*. London: Sage.
- Kasperson, R. E., Renn, O., Slovic, P., Brown, H. S., Emel, J., Goble, R., Ratick, S. (1988). The Social Amplification of Risk: A Conceptual Framework. *Risk Analysis*, 8(2), 177-187. DOI: 10.1111/j.1539-6924.1988.tb01168.x
- Krystallis, A., & Arvanitoyannis, I. (2006). Investigating the concept of meat quality from the consumers' perspective: The case of Greece. *Meat Science*, 72, 164-176. DOI:110.1016/j.meatsci.2005.1006.1013.
- Kuttschreuter, M., Rutsaert, P., Hilvarda, F., Regan, A., Barnett, J., & Verbeke, W. (2014). Seeking information about food-related risks: The contribution of social media. *Food Quality and Preference*, 37, 10-18.
- Lobb, A.E. (2005). Consumer trust, risk and food safety: A review. *Food Economics*, 2, 3-12. DOI:10.1080/16507540510033424.
- Marcu, A., Gaspar, R., Rutsaert, P., Seibt, B., Fletcher, D., Verbeke, W., & Barnett, J. (2015). Analogies, metaphors, and wondering about the future: Lay sense-making around synthetic meat. *Public Understanding of Science*. DOI: 10.1177/0963662514521106
- McCarthy, M., & Henson, S. (2005). Perceived risk and risk reduction strategies in the choice of beef by Irish consumers. *Food Quality and Preference*, 16, 435-445. DOI:10.1016/j.foodqual.2004.1008.1003.
- Miles, S., & Frewer, L. (2003). Public perception of scientific uncertainty in relation to food hazards. *Journal of Risk Research* 6(3), 267-283. DOI:10.1080/1366987032000088883.
- O'Mahony, P. (2013). Finding horse meat in beef products—a global problem. *QJMed*, 106, 595-597. doi:10.1093/qjmed/hct1087. DOI:10.1093/qjmed/hct087.
- Olsen, S., Prebensen, N., & Larsen, T. (2009). Including ambivalence as a basis for benefit segmentation: A study of convenience food in Norway. *British Food Journal*, 43, 762-783. doi:10.1108/03090560910947034.
- Petts, J. I., et al. (2001). *Social Amplification of Risk: the Media and the Public*, Contract Research Report 329/2001. Sudbury, HSE Books.
- Premanandh, J. (2013). Horse meat scandal - A wake-up call for regulatory authorities. *Food Control*, 34, 568-569. DOI:10.1016/j.foodcont.2013.1005.1033.
- Regan, Á., Marcu, A., Shan, L.C., Wall, P., Barnett, J., & McConnon, Á. (2015) Conceptualising responsibility in the aftermath of the horsemeat adulteration incident: an online study with

- Irish and UK consumers. *Health, Risk & Society*, 17, 149-167.
DOI:10.1080/13698575.2015.1030367
- Rutsaert, P., Barnett, J., Gaspar, R., Marcu, A., Pieniak, Z., Seibt, B., Fletcher, D., Lima, L., & Verbeke, W. (2015). Beyond information seeking: Consumers' online deliberation about the risks and benefits of red meat. *Food Quality and Preference*, 39, 191-201. DOI: 10.1016/j.foodqual.2014.07.011
- Siegrist, M., Earle, T.C., & Gutscher, H. (2003). Test of a trust and confidence model in the applied context of electromagnetic field (EMF) risks. *Risk Analysis*, 23, 705-716.
- Siegrist, M. (2010). Trust and Confidence: The Difficulties in Distinguishing the Two Concepts in Research. *Risk Analysis*, 30, 1022-1024. DOI:10.1111/j.1539-6924.2010.01454.x.
- Spink J. & Moyer D.C. (2011). Defining the Public Health Threat of Food Fraud. *Journal of Food Science*, 76, 157-163. DOI: 10.1111/j.1750-3841.2011.02417.x
- Taylor, A.W., Coveney, J., Ward, P.R., Dal Grande, E., Mamerow, L., Henderson, J., & Meyer, S.B., (2012). The Australian Food and Trust Survey: Demographic indicators associated with food safety and quality concerns. *Food Control*, 25, 476-483.
DOI:10.1016/j.foodcont.2011.1011.1003.
- Van Kleef, E., Frewer, L. J., Chrysoschoidis, G., Houghton, J. R., Korzen-Bohr, S., Krystallis, T., Lassen, J., Pfenning, U., & Rowe, G. (2006). Perceptions of food risk management among key stakeholders: Results from a cross-European study. *Appetite*, 47, 46-63.
DOI:10.1016/j.appet.2006.02.002.
- Van Kleef, E., Houghton, J., Krystallis, A., Pfenning, U., Rowe, G., Van Dijk, H., et al. (2007). Consumer Evaluations of Food Risk Management Quality in Europe. *Risk Analysis*, 27, 1565-1580. DOI:10.1111/j.1539-6924.2007.00989.x.
- van Rijswijk, W., & Frewer, L. (2008). Consumer perceptions of food quality and safety and their relation to traceability. *British Food Journal*, 110, 1034-1046.
DOI:10.1108/00070700810906642.
- Van Wezemael, L., Verbeke, W., Kügler, J., Barcellos, M. d., & Grunert, K. (2010). European consumers and beef safety: Perceptions, expectations and uncertainty reduction strategies. *Food Control*, 21, 835-844. DOI:10.1016/j.foodcont.2009.1011.1010.
- Van Wezemael, L., Verbeke, W., Kügler, J.O., & Scholderer, J. (2011). European consumer acceptance of safety-improving interventions in the beef chain. *Food Control*, 22, 1776-1784.
- Verbeke, W., Ward, R.W., & Avermaete, T. (2002). Evaluation of publicity measures relating to the EU beef labelling system in Belgium. *Food Policy*, 27, 339-353.
- Verbeke, W., & Vackier, I. (2004) Profile and effects of consumer involvement in fresh meat. *Meat Science*, 67, 159-168. DOI: 10.1016/j.meatsci.2003.09.017.
- Verbeke, W. (2005). Agriculture and the food industry in the information age. *European Review of Agricultural Economics*, 32, 347-368. DOI: 10.1093/eurag/jbi017.
- Verbeke, W., & Ward, R. (2006). Consumer interest in information cues denoting quality, traceability and origin: An application of ordered probit models to beef labels. *Food Quality and Preference*, 17, 453-467. DOI:10.1016/j.foodqual.2005.1005.1010.

- Verbeke, W., Frewer, L., Scholderer, J., & DeBrabander, H. (2007). Why consumers behave as they do with respect to food safety and risk information. *Analytica Chimica Acta*, 586, 2-7. doi:10.1016/j.aca.2006.1007.1065.
- Verbeke, W., Pérez-Cueto, F., de Barcellos, M., Krystallis, A., & Grunert, K. (2010). European citizen and consumer attitudes and preferences regarding beef and pork. *Meat Science*, 84, 284-292. DOI:210.1016/j.meatsci.2009.1005.1001.
- Yeung, R., Yee, W., & Morris, J. (2010). The effects of risk-reducing strategies on consumer perceived risk and on purchase likelihood. A modelling approach. *British Food Journal*, 112, 306-322. DOI:310.1108/00070701011029174.
- Zingg, A., Cousin, M., Connor, M., & Siegrist, M. (2013). Public risk perception in the total meat supply chain. *Journal of Risk Research*, 16, 1005-1020. DOI:1010.1080/13669877.13662013.13788057.

Annex 1:

Outline of the questions and content testers used to gather responses relating to processed meat products and incidents from the VIZZATA™ study conducted with Republic of Ireland (n = 32) and UK (n = 29) consumers.

Number	Pre content tester questions	Question type
1	How often do you currently buy products containing processed meat, e.g. burgers, ready meals, sausages, meat balls, etc.? Please choose from the dropdown menu below.	Closed
2	Think about the occasions when you buy processed meat. What would you say are the main benefits of buying these products?	Open
3	What do you see as the indicators of quality for processed meat products?	Open
4	Do you think that there are any downsides to buying processed meat products? If yes, what do you think that they are? If not, why do you think this?	Open
5	Do you try and deal with these downsides at all? How do you do this?	Open
6	How confident are you that processed food containing meat (e.g. ready meals or burgers) supplied from Ireland and the EU complies with the law in terms of safety standards and ingredients used?	Closed (7 point scale)
6b	What makes you feel like this?	Open
Number	Content tester headings	Question type
1	Update on horsemeat incident - Government initiatives	Open
2	The food industry: The impact of the horsemeat incident on the food industry	Open
3	Actions that the food industry has taken	Open
4	Supply chain and food traceability	Open
Number	Post content tester questions	Question type
1	Do you agree or disagree with this statement: I am buying less products containing processed meat as a result of horsemeat being found in burgers and some ready meals	Closed (Agree/Disagree)
2	If you selected 'agree' please tell us why you are buying fewer products containing processed meat now? If you selected 'disagree' please go to Question 4.	Open
3	Given that you are buying less products containing processed meat are you 'making up' for this in any way – for example, buying different things, buying from different places?	Closed (Yes/No)
3b	Please tell us a bit about this.	Open
4	Has the horsemeat incident changed your shopping behaviours in terms of reading and using labels on food products? Why is this?	Open
5	What do you think food companies and supermarkets should do, to restore the confidence of consumers in the food industry?	Open
6	Finally – looking again at the horsemeat issue – please indicate how much you agree with the following 2 statements: <ul style="list-style-type: none">• In my country, at the time that it happened the horsemeat incident was handled well by the food control authorities.• In my country, the food control authorities are currently doing a good job of getting to the bottom of the reasons for the horsemeat incident.	Closed (7 point scale)

